

**DIGITAL PHOTOGRAMMETRIC CAMERA SYSTEM,
POSITIONING SYSTEM, AND POST PROCESSING SOFTWARE
SPECIFICATIONS**

The contractor shall provide a photogrammetric-quality digital camera, yaw-stabilized camera mount, integrated positioning system, integrated data-acquisition system and flight-management system for airborne ortho-photography. The system must meet the following minimum specifications:

- 1) The airborne camera system is to be a 3 color (VIS or color IR)
- 2) Resolution of each of the 3 colors is to be 4Kx4K pixel or greater with 12 bit sampling. The system must be capable of capturing images every 2.5 seconds or slower to enable stereo collects at low-altitudes.
- 3) The digital camera must be co-mounted with a (Differential Global Positioning System) DGPS(L1/L2)/IMU positioning unit that provides active yaw stabilization of the camera mount and direct georeferencing of the image pixels. Drift correction range for the yaw-stabilization is ± 40 degrees with the stabilization accurate to better than .5 degrees rms in absolute sense. Yaw mount must be shock/vibration isolated for aircraft use.
- 4) Camera system must be radiometrically and geometrically calibrated.
- 5) The system must be capable of producing stereo models and orthorectified imagery using the exterior orientation (EO) computed directly from the embedded inertial/GPS system without the need to run aerial triangulation outputs
- 6) INS/GPS (Internal Navigation System/Global Positioning System) hardware must provide data capable of post-processed positioning and attitude of better than .1 meter and .1 degree respectively. Software for such processing must be included.
- 7) Data logging system must be ruggedized for airborne use (shock isolation) including pressurized disk drives.
- 8) System must include flight management system, mission planning software and remote pilot display.
- 9) Post-processing software must include: camera calibration (radiometric repeatability of better than 3%) and geometric image correction; dual-frequency differential-phase GPS and inertial navigation processing; and attitude generated exterior orientation for each camera image.
- 10) The maximum weight of the system components must not exceed 70 kg.

- 11) The system must draw less than 280 watts average while operating. The system must be powered by 28 VDC.
- 12) The system must be capable of operating (including all data recording devices) and maintaining calibration during 6 g, 11 msec shock, 6 times per direction, as specified in RTCA/DO-160D, Section 7. The system must be capable meeting crash safety specifications for 15 g shock, 11 msec, 1 time, as specified in RTCA/DO-160D Section 7.
- 13) The system must be capable of operating (including all data recording devices) and maintaining calibration during random and sinusoidal vibrations as specified in RTCA/DO-160D Section 8, Zone 2, Category M for aircraft, and Category G for helicopters.
- 14) The system must be capable of operating (including recording device) at altitudes up to 20,000 ft, un-pressurized.
- 15) The system must be radiometrically calibrated for both VIS and CIR modes. Evidence of radiometric characterization should be available. The sensor must be capable of linear response or gamma corrected modes. Repeatability or relative radiometry should be demonstrated to be within 5%. Tools and methods need to be available to provide white balance calibration on radiometric targets that are visible in collected imagery.
- 16) The Camera Sensor Head must be calibrated to sub-pixel level accuracy using Terrestrial and Airborne Calibration techniques. This includes Camera Interior Orientation (principal point, lens distortions, focal length) and IMU/Camera Boresight Angles.

NOTE: The **Radio Technical Commission for Aeronautics**, RTCA, can be accessed at website www.rtca.org pertaining to referenced areas stated above.